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United States
Department of
Agriculture

Soil
Conservation
Service

Montana
Agricultural
Experiment
Station

Bozeman,
Montana

MONTANA WATER SUPPLY OUTLOOK

Snowpack and Streamflow Forecasts as of March 1, 1983

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
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Winter storms by-pass Montana

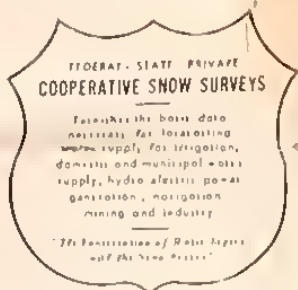
Most storms during February continued to travel both south and north of Montana. Nearly all mountainous areas continue to show less than average water stored in the snowpack.

In some parts of central Montana, the snowpack is only two-thirds of average. The Red Rock River drainage in the extreme southwestern corner is the only area having above average snow. This area has been receiving moisture from the edge of major storms tracking south of Montana.

Many low elevation areas and south-facing slopes are bare of snow, and soils in foothills and lower elevations are becoming frost-free. Mountain snowfall during the next 2 months will be very critical to Montana's spring and summer water supply.

The Montana Water Supply Outlook is a publication of the U.S. Soil Conservation Service. The SCS administers the Cooperative Snow Survey Program in cooperation with other federal, state and private agencies, organizations, and individuals.

The report is prepared by SCS, Snow Survey and Water Supply Forecast Staff, P.O. Box 98, Bozeman, Montana.



Warm winter

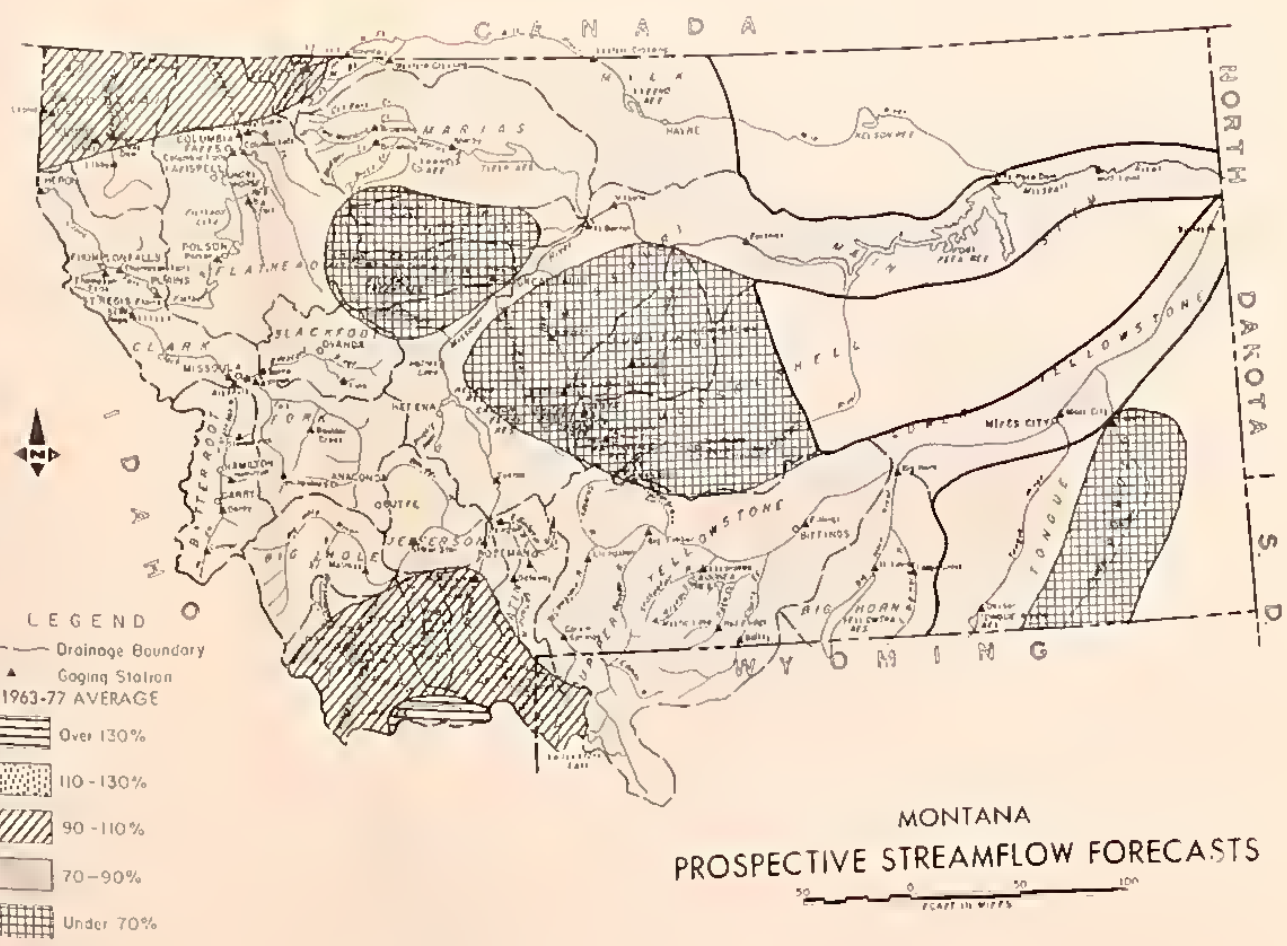
Preliminary information provided by the National Weather Service indicates that some locations in south central Montana and adjacent areas in Wyoming had the warmest winter (December, January and February) on record. The area east of the Divide was not the warmest of record but was well above normal. Most stations averaged 10 to 15 degrees (F) above long-term normals. Temperatures west of the Divide had somewhat less departure but were still above the long-term normals.

Most Montanans will agree that this has been "one of the best winters ever" for temperatures and valley snowfall.

Streamflow forecasts below average

The southwest and northwest corners of the state will have near average runoff this spring and summer. The central part of the state is predicted to have very low runoff.

Irrigation water shortages are expected to develop by late June to early July in most areas. The severity of these shortages will be very dependent on mountain snowfall in the next 2 to 3 months and weather patterns developing the remainder of this season.



MONTANA
PROSPECTIVE STREAMFLOW FORECASTS

Yellowstone River Drainage

STREAMFLOW FORECASTS

BASIN, STREAM MILE, FORECAST POINT	THIS YEAR				PAST RECORD			
	FORECAST	1963-77 AVERAGE	1963-77 AVERAGE	1963-77 AVERAGE	FORECAST	1963-77 AVERAGE	1963-77 AVERAGE	1963-77 AVERAGE
	April - September				April - July			
YELLOWSTONE RIVER at Corwin Springs	1865	89	2497	2,102	1560	89	1978	1,749
YELLOWSTONE RIVER near Livingston	2125	86	2,471	1,770	86			2,048
BOULDER RIVER at Big Timber	340	82	416	310	81			382
STILLWATER near Absarokee (1)	565	86	660	480	86			555
CLARK'S FORK RIVER near Bellfry	512	80	644	450	80			564
ROCK CREEK near Red Lodge	Streamflow measurements	118	discontinued by USGS	91.4				
INFLOW COONEY RESERVOIR near Boyd (2)	56.5	88	64.5	46.0	88			52.5
YELLOWSTONE RIVER at Billings	4060	87	5171	4,682	3420	86	4307	3,979
BIGHORN RIVER near St. Xavier (3)	1645	81	2116	2,034	1510	81	1693	1,861
LITTLE BIGHORN RIVER near Hurlin	165	84	112	196	145	83	96.6	174
TONGUE RIVER near Brockton	224	78		288	204	78		263
YELLOWSTONE RIVER at Miles City (4)	5710	80		7,142	5000	80		6,243
POWDER RIVER at Moorhead	174	69		253	162	69		234
YELLOWSTONE RIVER near Sidney (5)	6245	80		7,806	5440	80		6,805

- (1) Adjusted for storage in Mystic Lake.
(2) Adjusted for storage in Cooney Reservoir.
(3) Adjusted for storage in Buffalo Bill, Boyce, Bull Lake, Pilot Butte and Bighorn Reservoirs.
(4) Adjusted for storage in Bull Lake, Buffalo Bill, Boyce, Pilot Butte, Bighorn and Tongue River Reservoirs.
(5) Adjusted for reservoirs shown in (4) and diversions into the Lower Yellowstone Canal.

ALL FORECASTS PREPARED IN COOPERATION WITH THE NATIONAL WEATHER SERVICE

WATER SUPPLY OUTLOOK

Expressed as "Poor, Fair, Average, Excellent" with Respect to Usual Supply.

STREAM or AREA	Flow Period	
	Spring Season	Late Season
Yellowstone at Livingston	Avg	Fair
Shields	Fair	Poor
Boulder	Fair	Fair
Sweetgrass - Big	Fair	Poor
Timber	Fair	Poor
Stillwater	Fair	Fair
Rock Creek	Fair	Fair
Clark's Fork	Fair	Fair
Yellowstone above Bighorn	Fair	Fair
Bighorn	Fair	Fair
Bighorn/Wyoming	Fair	Fair
Little Bighorn	Fair	Poor
Tongue	Fair	Poor
Powder	Fair	Poor
Lower Yellowstone	Fair	Fair

Runoff forecast below average

Spring and summer runoff is forecast to be 10 to 15 percent less than average on the Yellowstone River and upstream tributaries. The Bighorn River and downstream tributaries will have even less runoff.

Early season runoff will be below average due to low elevation snowpack shortages. Streamflows will also begin to drop earlier than normal due to below average high elevation snowpack.

Irrigation water supply shortages will develop by late June and July and continue through the irrigation season. The overall impacts of these shortages will be very dependent on the snowfall received over the next 2 to 3 months.

Irrigators that do not have stored water and that have later water rights may want to consider their cropping patterns or utilizing other alternatives to minimize the impacts of a short water supply.

Yellowstone snowpack remains low

All headwater areas have below average snowpack. Most drainages show only two-thirds to three-quarters of the average amount of water stored in their snowfields.

Most of the drainages above the Bighorn River have snowpack percentages similar to those reported last month, while those in Wyoming have decreased.

South-facing slopes and lower elevation areas have little or no snow remaining. Soils are thawing and will soon be able to absorb rainfall and snowmelt.

Snowfall during the next 2½ months will be very significant in determining the season's water supply. Continuation of present weather trends could mean water shortages in many areas.

SUMMARY of SNOW MEASUREMENTS

(COMPARISON WITH PREVIOUS YEARS)

RIVER BASIN and/or SUBWATERSHED	Number of Gauging Stations	THIS YEAR'S SNOW WATER AS PERCENT OF	
		Last Year	1963-77 Average
Upper Yellowstone			
ab Livingston	21	75	76
Shields	8	87	74
Boulder & Stillwater	4	73	66
Rock Creek & Clark's Fork	17	90	82
Yellowstone (ab Bighorn River)	50	81	77
Bighorn/Wyoming	26	79	79
Little Bighorn	3	128	81
Bighorn (Total)	29	82	79
Tongue	5	113	83
Powder	6	94	79
Yellowstone (Total)	90	84	79

Missouri River & Hudson Bay Drainages

STREAMFLOW FORECASTS

BASIN, STREAM MILE, FORECAST POINT	THIS YEAR				PAST RECORD			
	FORECAST	1963-77 AVERAGE	1963-77 AVERAGE	1963-77 AVERAGE	FORECAST	1963-77 AVERAGE	1963-77 AVERAGE	1963-77 AVERAGE
	April - September				April - July			
RED ROCK RIVER near Honida (1)	129	117	150	110	123	119	135	103
BEAVERHEAD RIVER near Grant (2)	179	105	228	171	160	108	194	148
BEAVERHEAD RIVER at Barratts (2)	230	102		226	202	103		196
RUBY RIVER near Alder	105	100		105	90.0	101		89.0
BIG HOLE RIVER near Halrose	650	82		792	600	82		730
BOULDER RIVER near Boulder	Streamflow measurements	103	discontinued	96.7				
WILLOW CREEK near Harrison	19.9	93		21.5	18.0	94		19.2
HADISON RIVER near Grayling (3)	526	101	584	523	416	102	456	409
HADISON RIVER near McAllister (4)	855	96	1024	892	686	97	797	706
GALLATIN RIVER near Gateway	490	86	592	572	422	86	503	488
INFLOW MIDDLE CREEK RESERVOIR near Bozeman (5)	22.7	75		30.3	19.6	75		26.2
HYALITE CREEK near Bozeman (6)	35.8	76		47.4	31.2	76		41.0
GALLATIN RIVER at Logan	470	72		669	412	74		557
MISSOURI RIVER at Toston (7)	2230	83	3470	2,671	1940	83	3072	2,330
SHEEP CREEK near White Sulphur Springs	14.0	61	24.5	22.8	12.0	61	21.0	19.8
SUN RIVER at Gibson Dam (8)	355	61	596	580	320	60	544	529
BELT CREEK near Monarch	83.0	57		146	75.0	56		134
MISSOURI RIVER at Fort Benton (9)	3185	77		4,148	2800	77		3,640
TWO MEDICINE CREEK near Browning (10)	190	73		259	180	74		244
BADGER CREEK near Browning	95.0	71		133	81.0	70		116
MARIAS RIVER near Shelby	402	70	521	577	372	70	494	532
MISSOURI RIVER at Virgelle (11)	3615	75		4,793	3180	75		4,238
MISSOURI RIVER near Landsky (11)	4000	77		5,214	3520	77		4,586
NORTH FORK MUSSELSHELL RIVER near Delpine	3.2	50		6.4	2.7	49		5.5
SOUTH FORK MUSSELSHELL RIVER above Mattinsdale	30.5	50		61.5	29.0	50		57.6
MISSOURI RIVER below Fort Peck Dam (11)	3700	75		4,929	3290	75		4,381
MILK RIVER at Eastern Crossing*	269	97		278				
MILK RIVER at Eastern Crossing (12)*	88.8	80		111				
INFLOW LAKE SAKAKAWA, ND (11)	10360	77		13,450	9430	77		12,239
SASKATCHEWAN RIVER BASIN								
SWIFTCURRENT CREEK at Sherburne (13)	126	95	133	132	109	95	117	115
ST. MARY'S RIVER near Babb (13)	476	96		498	411	96		426

*March-September forecast

- (1) Adjusted for storage in Lima Reservoir.
(2) Adjusted for storage in Lima and Clark Canyon Reservoirs.
(3) Adjusted for storage in Hebgen Lake.
(4) Adjusted for storage in Hebgen Lake and Ennis Lake.
(5) Sum of West Fork Hyalite Creek and East Fork Hyalite Creek above the Reservoir.
(6) Adjusted for storage in Middle Creek Reservoir.
(7) Adjusted for storage in Lima, Hebgen, Ennis & Clark Canyon Reservoirs.
(8) Adjusted for storage in Gibson Reservoir & diversions.
(9) Adjusted for storage in Lima, Clark Canyon, Hebgen, Ennis, Gibson, Pliskun, Willow Creek & Canyon Ferry Reservoirs.
(10) Adjusted for storage in Two Medicine Reservoir & diversions in Two Medicine Canal.
(11) Adjusted for all upstream reservoirs.
(12) Flow at Eastern Crossing minus St. Mary's Canal.
(13) Adjusted for storage in Lake Sherburne.

ALL FORECASTS PREPARED IN COOPERATION WITH THE NATIONAL WEATHER SERVICE

WATER SUPPLY OUTLOOK

Expressed as "Poor, Fair, Average, Excellent" with Respect to Usual Supply.

STREAM or AREA	Flow Period	
	Spring Season	Late Season
Beaverhead	Avg	Avg
Ruby	Avg	Avg
Big Hole	Avg	Fair
Boulder	Avg	Fair
Jefferson	Avg	Fair
Hadison	Avg	Avg
Gallatin	Avg	Fair
West-Side Missouri	Avg	Fair
Smith-Belt	Fair	Poor
Sun	Fair	Poor
Teton	Fair	Fair
Marias	Fair	Fair
Judith	Fair	Poor
Musselshell	Fair	Poor
Milk	Fair	Fair
Bear Paws	Fair	Fair
St. Mary's	Avg	Avg

SUMMARY of SNOW MEASUREMENTS

(COMPARISON WITH PREVIOUS YEARS)

RIVER BASIN and/or SUBWATERSHED	Number of Gauging Stations	THIS YEAR'S SNOW WATER AS PERCENT OF	
		Last Year	1963-77 Average
Beaverhead	23	92	102
Ruby	11	97	102
Big Hole	21	73	89
Boulder	13	81	80
Jefferson	68	84	95
Hadison	33	93	99
Gallatin	23	87	82
Missouri Headwater	124	88	93
West-side Missouri (Toston-Cascade)	9	81	78
Smith-Belt-Arrow	13	68	67
Missouri Main-stem	22	72	70
Teton & Sun	10	57	63
Marias	4	65	68
Marias-Teton-Sun	14	60	65
Judith-Musselshell	14	74	68
Milk	7	56	61
Bear Paws	6	43	42
Missouri (Total)	174	83	86

Saskatchewan			
St. Mary's	3	85	87
Bow River in Alberta	11	91	84

Snowpack percentages drop

The warm and dry weather pattern of January has continued into February. The snowpack percentages have decreased this past month in most areas.

The present snowpack varies from near average in the extreme southwest to about two-thirds average in the headwaters of most drainages flowing into the Missouri River below Three Forks. Low elevations and south-facing slopes continue to have little or no snow cover due to mild temperatures. Soils in some areas have thawed or are close to thawing.

The amount of snowfall deposited on the mountain watersheds over the next 2 months will be very critical in determining this season's potential water supply. If present weather patterns continue, mid and late season water supplies will be critical in many areas.

Missouri runoff below average

Runoff during the coming spring and summer will be below average in most areas. Only the drainages in southwest Montana and the St. Mary's River, originating in Glacier National Park, have near average runoff forecasted.

All other streams will have lower than normal early season flows due to lack of low elevation snow. Streamflows will start dropping earlier than usual due to higher elevation snow shortages. Irrigation water supply shortages will begin developing by late June and early July continuing through the irrigation season.

The extent and severity of these shortages will be very dependent on the mountain snowfall over the next 2 months.

Irrigators not having stored water and with late water rights should consider alternatives that will minimize the impacts of deficient water supplies.

YELLOWSTONE RIVER DRAINAGE MONTANA

MOUNTAIN SNOW WATER EQUIVALENT

- Over 120%
80 - 120%
Under 80%

VALLEY PRECIPITATION FEBRUARY 1983

Source: NWS Great Falls, MT

MISSOURI RIVER & HUDSON BAY DRAINAGES MONTANA

MOUNTAIN SNOW WATER EQUIVALENT

- Over 130%
110 - 130%
90 - 110%
70 - 90%
Under 70%

SNOW SURVEY DATA

DRAINAGE BASIN and/or SNOW COURSE		THIS YEAR		PAST RECORD	
NAME	Elevation	Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Average
ABUNDANCE LAKE	8800	2/25	52	15.9	22.2
AMBROSE	6480	2/22	35	9.4	12.9
ARCH FALLS	7350	2/28	31	7.8	10.4
ASHLEY DIVIDE	4820	2/25	19	4.8	7.6
ASHLEY LAKE	4000	2/25	17	4.9	6.5
BADGER PASS	6900	2/23	66	24.3	38.0
BADGER PASS PILLOW	6900	2/23	SP	20.9	34.2
BALO EAGLE PEAK	5700	2/25	106	42.9	59.2
BALO RIDGE	7500	2/24	32	8.6	10.3
BANFIELD MOUNTAIN	5600	2/25	55	20.3	24.2
BANFIELD MOUNTAIN PILLOW	5600	2/25	SP	18.1	21.3
BARRE CREEK	5500	2/24	97	38.9	45.4
BARRE MIDWAY	4600	2/24	83	30.6	34.1
BARRE TRAIL	3800	2/24	14	4.8	8.6
BARKER LAKES PILLOW	8250	3/01	SP	14.6	13.2
BASIN CREEK	7180	2/25	29	7.4	8.6
BASIN CREEK PILLOW	7180	3/01	SP	6.1	7.2
BASSOON PEAK	5150	3/01	21	7.2	9.6
BEAGLE SPRINGS	8850	2/26	31	7.0	9.7
BEAGLE SPRINGS PILLOW	8850	3/01	SP	5.9	8.7
BEAR BASIN	8150	2/28	58	16.2	19.1
BEAR PAW SKI AREA	5200	2/22	12	3.8	6.4
BEAVER LAKE	5900	2/23	41	13.4	23.4
BERRY MEADOW	7300	2/28	22	6.2	7.8
DIG COULEE	5100	2/28	15	4.3	6.2
DIG CREEK	6750	2/23	100	38.3	38.6
DIG SKY	7700	2/28	50	12.6	15.2
DIG SKY MEADOW	6350	2/22	35	7.8	9.8
DIG SNOWY	7150	2/22	44	12.5	13.8
BLACK BEAR	7950	2/24	103	39.7	44.4
BLACK BEAR PILLOW	7950	2/24	SP	32.4	38.8
BLACK MOUNTAIN	7750	2/23	38	11.2	14.0
BLACK PINE	7100	2/24	31	9.0	14.4
BLACK PINE PILLOW	7100	2/24	SP	8.6	15.1
BLOODY DICK	7600	2/24	37	10.5	16.7
BLOODY DICK PILLOW	7600	2/24	SP	9.3	14.2
BLUE LAKE	5900	2/23	48	17.0	24.2
BOIS SOIS	8000	2/23	26	5.8	5.0
BOULDER MOUNTAIN	7950	2/23	46	14.4	18.0
BOULDER MOUNTAIN PILLOW	7950	3/01	SP	16.8	20.0
BOX CANYON	6670	2/25	26	7.2	10.6
BOX CANYON PILLOW	6670	3/01	SP	5.3	7.2
BOXELDER CREEK	5100	2/28	18	5.6	6.8
BRANHAM LAKES	8850	2/28	80	25.2	29.8
BRIDGER BOWL	7250	2/24	54	16.5	20.1
BRIDGER BOWL PILLOW	7250	2/24	SP	15.6	19.1
BRISTOW CREEK	3900	2/25	24	9.0	12.2
BRUSH CREEK LIMBER	5000	2/28	27	7.6	10.0
BULL MOUNTAIN	6600	2/24	21	5.8	6.2
CADIZ CREEK	5200	2/26	11	3.2	6.3
CALL ROAD	8050	2/25	39	10.2	9.2
CALVERT CREEK	6450	2/25	37	9.6	13.3
CALVERT CREEK PILLOW	6450	2/25	SP	7.6	11.2

DRAINAGE BASIN and/or SNOW COURSE		THIS YEAR		PAST RECORD	
NAME	Elevation	Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Average
FLATTOP MOUNTAIN PILLOW	6300	3/01	SP	39.1	41.9
FLEECER RIDGE	7500	2/24	30	8.4	12.0
FOOLHEN	8280	2/25	43	12.0	16.7
FOUR MILE	6900	2/22	29	7.8	5.6
FOURTH OF JULY	3450	2/28	25	7.6	7.6
FRED HURR PASS	8000	2/25	53	17.4	25.0
FREIGHT CREEK	6000	2/23	29	8.7	15.9
FRIDAY HILL	4620	2/28	62	22.4	19.0
FROHNER MEADOWS	6480	2/24	24	6.6	6.4
FROHNER MEADOWS PILLOW	6480	2/24	SP	6.3	7.5
GARVER CREEK	4250	2/25	28	10.3	11.8
GARVER CREEK PILLOW	4250	2/25	SP	9.4	9.3
GIBBONS PASS	7100	2/28	66	21.3	26.8
GOAT MOUNTAIN	7000	2/27	19	5.5	10.3
GOLD CREEK LAKE	7200	2/22	38	10.9	14.1
GOLD STONE	8100	2/24	44	12.9	21.0
GRASSHOPPER	7000	2/22	18	4.2	4.8
GRAVE CREEK	4300	2/25	49	18.2	16.4
GRAVE CREEK PILLOW	4300	2/25	SP	16.2	17.7
GRIFFIN CREEK DIVIDE	5150	3/01	28	8.2	11.9
GRIZZLY PEAK	8640	2/25	45	14.4	9.9
GUNSLIGHT LAKE	6300	2/23	78	28.8	40.8
HAND CREEK	5030	2/28	35	9.6	12.9
HAND CREEK PILLOW	5030	3/01	SP	4.8	13.2
HAWKINS LAKE	6450	2/25	76	29.6	31.0
HAWKINS LAKE PILLOW	6450	2/25	SP	25.0	26.1
HEART LAKE TRAIL	4800	2/26	43	15.4	20.8
HERGEN DAM	6550	3/01	50	13.0	11.6
HELL ROARING DIVIDE	5770	2/26	69	22.2	26.9
HERRIG JUNCTION	4850	2/23	69	22.6	25.0
HIGHWOOD DIVIDE	5650	2/28	22	7.2	9.1
HIGHWOOD STATION	4600	2/28	0	0.0	4.4
HOLBROOK	4530	2/28	21	6.4	10.3
HOOD MEADOW	6600	2/28	24	6.1	9.1
HOODOO BASIN	6000	2/26	111	40.4	49.9
HOODOO BASIN PILLOW	6000	3/01	SP	36.0	46.1
HOODOO CREEK	5900	2/26	105	36.6	47.5
INDEPENDENCE	7850	2/25	39	10.8	15.8
INTERGAARD	6450	2/25	18	4.8	7.3
JACK CREEK	7500	2/23	25	5.3	4.2
JAMNKE LAKE TRAIL	7200	2/24	31	8.4	12.8
JOHNSON PARK	6450	2/24	17	3.9	6.8
KEELER CREEK	3300	2/25	30	11.3	14.7
KINGS HILL	7500	2/25	28	7.7	12.8
KISHENEHILL	3890	2/26	25	6.0	9.6
KIWAHIS CAMP	3720	2/28	0	0.0	2.0
KRAFT CREEK PILLOW	4750	3/01	SP	11.1	15.5
LAKE CREEK	6100	2/25	34	8.3	6.9
LAKEVIEW CANYON	6930	2/25	41	12.8	6.7
LAKEVIEW RIDGE	7400	2/25	40	12.8	6.9
LAKEVIEW RIDGE PILLOW	7400	3/01	SP	13.9	7.6
LEMMI PASS	7480	2/26	26	5.2	8.8
LEMMI RIDGE	8100	2/26	31	6.4	10.8
LEMMI RIDGE PILLOW	8100	2/26	SP	6.2	10.5
LICK CREEK	6860	2/28	28	6.4	8.8
LICK CREEK PILLOW	6860	2/28	SP	5.5	7.7
LITTLE PARK	7400	2/22	47	11.7	15.0
LOGAN CREEK	4300	2/25	20	4.4	7.0

SNOW SURVEY DATA

Con't.

DRAINAGE BASIN and/or SNOW COURSE		THIS YEAR		PAST RECORD	
NAME	Elevation	Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Average
PORCUPINE	6500	2/24	20	5.0	6.0
PORCUPINE PILLOW	6500	2/24	SP	5.5	5.7
POTOMAGETON PARK	7150	3/01	50	13.4	12.3
RED MOUNTAIN	6000	3/01	54	16.8	18.2
RED TOP	5260	2/28	77	27.0	26.4
ROCK CREEK	5600	2/22	25	6.8	6.6
ROCK CREEK MEADOWS	8160	2/23	56	15.1	20.4
ROCKER PEAK	8000	2/24	31	8.8	13.9
ROCKER PEAK PILLOW	8000	2/24	SP	9.6	14.4
ROCKY BOY	4700	2/28	7	1.4	3.4
ROCKY BOY PILLOW	4700	2/28	SP	3.6	4.7
SACAJAWEA	6550	2/24	41	11.8	11.5
SADDLE MOUNTAIN	7940	2/28	67	21.6	28.6
SADDLE MOUNTAIN PILLOW	7940	2/28	SP	21.3	29.4
SENTINEL CREEK	8300	3/01	EST	21.2	20.0
SHOWER FALLS	8100	2/28	52	16.4	19.1
SHOWER FALLS PILLOW	8100	3/01	SP	16.4	18.6
SILVER RUN	6630	2/25	16	4.6	1.2
SILVER RUN PILLOW	6630	2/25	SP	3.7	2.7
SKALKAHO SUMMIT	7260	2/23	61	19.0	28.4
SKALKAHO SUMMIT PILLOW	7260	3/01	SP	17.9	28.2
SKYLARK TRAIL PILLOW	6200	3/01	SP	23.1	35.1
SLAG-A-MELT LAKE	8750	2/25	66	23.2	29.7
SLIDE ROCK MOUNTAIN	7100	2/23	37	10.4	15.6
SMUGGLER MINE	6960	2/28	40	10.2	9.7
SOUTH FORK SHIELDS	8100	2/24	53	17.4	20.6
SOUTH FORK SHIELDS PILLOW	8100	2/24	SP	11.7	14.0
SPOTTED BEAR MOUNTAIN	7000	2/23	36	11.4	15.8
SPUR PARK	8100	2/25	41	12.4	20.3
SPUR PARK PILLOW	8100	2/25	SP	13.7	20.1
STAHL PEAK	6050	2/25	95	34.0	34.3
STAHL PEAK PILLOW	6050	2/25	SP	30.0	31.0
STIEPLE PASS	6600	2/25	27	7.0	9.9
STORM LAKE	7780	2/24	38	11.2	10.3
STRYKER BASIN	6180	2/23	81	28.2	29.9
STUART MILL	6500	2/25	17	4.6	6.2
STUART MOUNTAIN	7400	2/27	78	27.8	30.0
SUCKER CREEK	3960	2/28	0	0.0	0.7
TAYLOR ROAD	4080	2/28	0	0.0	3.0
TEN MILE LOWER	6600	2/23	22	6.4	5.8
TEN MILE MIDDLE	6800	2/23	31	7.8	9.6
TEN MILE UPPER	8000	2/23	33	8.8	11.3
TEPEE CREEK	8000	2/25	50	12.8	13.9
TEPEE CREEK PILLOW	8000	2/25	SP	12.0	11.3
TIMBERLINE CREEK	8850	2/23	44	12.2	8.8
TRAIL CREEK	7090	2/26	25	4.3	8.5
TRIMMIS LAKE	6100	2/23	87	31.9	41.6
TRUMAN CREEK	4060	2/25	8	2.8	4.4
TV MOUNTAIN	6800	2/27	48	15.8	17.1

DRAINAGE BASIN and/or SNOW COURSE		THIS YEAR		PAST RECORD	
NAME	Elevation	Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Average
FERMIE (BC)	3510	2/25	21	7.7	8.9
FERMIE EAST (BC)	4100	2/25	43	14.3	15.1
FERMIE NE (BC)	3510	2/25	28	9.6A	10.2
FOLELITY MOUNTAIN (BC)	6130	2/28	99	31.6	44.5
GLACIER (BC)	4200	2/23	22	5.7A	8.3
GRAY CREEK (BC)	4100	2/28	58	20.7	28.3
GRAY CREEK LOWER (BC)	5080	2/28	41	14.8	15.4
GRAY CREEK UPPER (BC)	6260	2/28	70	22.8	30.8
KICKING HORSE (BC)	5410	2/23	35	10.7	12.8
KIMBERLEY (BC)	3800	2/27	19	4.8A	7.5
KIMBERLEY LOWER VOR (BC)	4490	2/24	25	6.8	8.6
KIMBERLEY MIDDLE VOR (BC)	5510	2/24	34	9.4	11.0
KIMBERLEY UPPER VOR (BC)	7020	2/24	46	13.7	16.0
MORRIS CANYON (BC)	4990	3/02	EST	11.8	14.4
MOUNT ABBOT (BC)	6100	2/24	72	25.7	26.5
MOYIE MOUNTAIN (BC)	6490	2/28	107	34.3	45.5
SINCLAIR PASS (BC)	6360	2/28	47	15.2	15.1
SULLIVAN HILL (BC)	4490	2/28	16	3.5	11.6
UPPER ELK RIVER (BC)	5080	2/25	33	9.3	12.0
	4400	2/27	7	2.8	6.1

IDAHO						
ABOVE BURKE (ID)	4100	2/28	40	15.4	18.1	22.9
BEAR MOUNTAIN (ID)	5400	2/25	140	59.7	61.8	53.7
BEAR MOUNTAIN PILLOW (ID)	5400	2/25	SP	57.9	68.1	-
BIG SPRINGS (ID)	6500	2/25	40	19.4	20.2	18.7
BLACK CANYON (ID)	7960	2/24	91	31.8	36.6	29.9
BLACK MOOSE (ID)	8160	2/24	106	40.4	40.2	36.1
CAMP CREEK (ID)	6580	3/01	52	14.0	8.1	9.8
CRAIG CREEK PILLOW (ID)	6860	3/01	SP	22.1	11.8	-
HUMBOLDT GULCH (ID)	4250	2/28	34	12.8	13.6	-
HUMBOLDT GULCH PILLOW (ID)	4250	3/01	SP	11.5	14.1	-
ISLAND PARK (ID)	6290	2/25	57	18.1	16.7	15.1
ISLAND PARK PILLOW (ID)	6290	3/01	SP	17.9	15.3	-
KILGORE (ID)	6320	2/28	52	14.6	10.4	10.6
KIT CARSON (ID)	4950	2/24	22	5.2	11.7	-
LATHAM SPRINGS (ID)	7630	2/24	87	31.2	34.0	28.6
LOLO PASS (ID)	5230	3/01	59	19.1	31.8	27.5
LOOKOUT (ID)	5250	2/28	80	29.0	30.6	31.0
LOOKOUT PILLOW (ID)	5250	3/01	SP	28.9	30.5	-
LUCKY DOG (ID)	6860	2/24	76	24.4	27.3	22.1
MOOSE CREEK (ID)	6200	2/25	54	16.8	21.5	15.6
MOOSE CREEK PILLOW (ID)	6200	3/01	SP	17.1	21.5	-
MOSQUITO RIDGE (ID)	5200	2/27	115	40.4A	38.3	34.6
MOSQUITO RIDGE PILLOW (ID)	5200	3/01	SP	37.7	33.7	-
SAVAGE PASS (ID)	6170	3/01	60	19.6	29.0	24.1
SAWTELL MOUNTAIN (ID)	8720	2/25	97	36.6	33.6	28.4
SUNSET (ID)	5540	2/27	101	35.5A	39.1	32.6
SUNSET PILLOW (ID)	5540	3/01	SP	30.8	35.8	-
TARGHEE PASS (ID)	6980	2/25	47	14.4	14.1	13.6
VALLEY VIEW (ID)	6680	2/25	48	16.0	14.6	15.6
WHITE ELEPHANT (ID)	7710	2/25	69	23.6	25.3	18.1

Columbia River Drainage

STREAMFLOW FORECASTS

BASIN, STREAM, WEIR, FORECAST POINT	THIS YEAR			PAST RECORD			THIS YEAR			PAST RECORD		
	Forecast	Period of Average	Unit	Forecast	Period of Average	Unit	Forecast	Period of Average	Unit	Forecast	Period of Average	Unit
	April - September			April - July			April - June					
KOOTENAI RIVER below Libby Dam (1)	6,650	92	7,017	7,246	5,670	92	5,878	6,178				
FISHER RIVER near Libby	220	81		270	205	81		253				
YAKA RIVER near Troy	490	91		537	465	90		514				
KOOTENAI RIVER at Leona (1)	8,350	94	8,643	8,883	7,260	94	7,413	7,727	5780	94	5,921	6,150
INFLOW MOULTON RESERVOIR nr BUTTE (Hillion Gallons)					210	73		360	286			
WARM SPRINGS CREEK AT MEYERS DAM near Anaconda (2)	40.7	80		50.7	33.0	80		41.2				
FLINT CREEK near Southern Cross (3)	13.9	75	24.6	18.5	11.5	75		15.4				
FLINT CREEK below Boulder Creek (4)	58.8	76		77.6	46.0	75		61.3				
INFLOW LOWER WILLOW CREEK RESERVOIR near Hall (5)	11.8	70	15.9	16.9	11.1	69	15.1	16.0				
MIDDLE FORK ROCK CREEK near Philipsburg	67.0	85		78.8	60.5	85		71.1				
NEVADA CREEK near Finn	16.5	70		23.6	15.1	69		21.8				
BLACKFOOT RIVER near Bonner	790	78		1,017	710	77		920	610	77		794
CLARK FORK RIVER above Hilltown (6)	715	85		843	620	85		730	530	86		613
CLARK FORK RIVER above Missoula	1,505	81	2,260	1,859	1,330	81	2,038	1,651	1,140	81	1,645	1,408
WEST FORK BITTERROOT RIVER near Conner (7)	153	82		187	140	81		172				
BITTERROOT RIVER near Darby	455	76		602	420	76		552	370	77		480
SKALKAH CREEK near Hamilton	47.5	83		57.4	41.5	83		49.8				
BURNT FORK CREEK near Stevensville (8)	32.6	84		38.8	28.5	85		33.6				
BITTERROOT RIVER at Missoula (9)	1,165	76		1,543	1,070	76		1,416	930	77		1,211
CLARK FORK RIVER below Missoula	2,670	78		3,405	2,400	78		3,069	2,070	79		2,618
CLARK FORK RIVER at St. Regis	3,510	78	5,715	4,521	3,150	77	5,292	4,078	2,690	77	4,309	3,492
NORTH FORK FLATHEAD RIVER near Columbia Falls	1,750	89		1,969	1,590	89		1,782	1,350	90		1,498
MIDDLE FORK FLATHEAD RIVER near West Glacier	1,560	82	2,083	1,911	1,430	82	1,925	1,750	1,220	83	1,544	1,470
SOUTH FORK FLATHEAD RIVER near Columbia Falls (10)	1,850	80	2,559	2,302	1,720	80	2,428	2,159	1,510	80	2,034	1,884
FLATHEAD RIVER at Columbia Falls (10)	5,280	83	6,549	6,330	4,900	84	6,080	5,827	4,200	85	4,990	4,964
SWAN RIVER near Big Fork	575	84		681	505	85		596				
FLATHEAD RIVER near Polson (11)	6,180	84	8,005	7,394	5,720	84	7,323	6,806	4,900	85	5,910	5,779
CLARK FORK RIVER near Plains (11)	9,850	80	14,103	12,340	9,960	80	12,939	11,222	7,600	80	10,447	9,507
THOMPSON RIVER near Thompson Falls	236	90		263	211	90		234				
PROSPECT CREEK at Thompson Falls	124	87		143	115	86		133				
CLARK FORK RIVER at Whitehorse Rapids (12)	11,100	81		13,781	10,100	81		12,519	8,610	81		10,633

- (1) Adjusted for storage in Lake Kootenai.
- (2) Adjusted for storage in Silver Lake, diversions to and pumping from Georgetown Lake.
- (3) Adjusted for storage in Georgetown Lake, diversions from and pumping to Silver Lake.
- (4) Sum Flint Creek at Havville and Boulder Creek at Havville.
- (5) Sum of North Fork Lower Willow Creek near Hall and South Fork Lower Willow Creek near Hall.
- (6) Difference in observed flow Clark Fork above Missoula and Blackfoot near Bonner.

- (7) Adjusted for storage in Painted Rocks Reservoir.
- (8) Adjusted for diversion into Sunset Highway Canal.
- (9) Difference in observed flow Clark Fork above and below Missoula.
- (10) Adjusted for storage in Hungry Horse Reservoir.
- (11) Adjusted for storage in Hungry Horse Reservoir and Flathead Lake.
- (12) Adjusted for storage in Hungry Horse Reservoir, Flathead Lake and Hoxa Rapids Reservoir.

ALL FORECASTS PREPARED IN COOPERATION WITH THE NATIONAL WEATHER SERVICE

SUMMARY OF SNOW MEASUREMENTS

RIVER BASIN and SUBWATERSHED	Number of Gauging Stations	THIS YEAR'S SNOW WATER AS PERCENT OF LAST YEAR
East Kootenai/BC	19	79
Kootenai/Montana	26	87
Kootenai above Bonners Ferry...	45	84
Little Bitterroot	5	74
N. Fk. Flathead...	10	94
N. Fk. Flathead...	9	75
S. Fk. Flathead...	12	81
Swan	9	86
Flathead	45	84
Stillwater & Whitefish	5	75
Clark Fork above Blackfoot	35	74
Blackfoot	21	70
Upper Clark Fork above Missoula	56	72
Bitterroot	17	66
Lower Clark Fork below Missoula	19	82
Clark Fork (Total w/o Flathead)...	92	74
Pend O'Reille (Clark Fork & Flathead)	137	78
Columbia (Pend O'Reille & Kootenai)	182	80

Irrigation shortages expected

Most drainages are forecast to produce below average spring and summer runoff. Only in the north-west are streamflows expected to be near average. Most streams should produce 15 to 25 percent less runoff than normal.

Irrigation water supply shortages are expected to develop in late June to early July due to lack of good high elevation snowpack. The extent of these shortages will be somewhat dependent on mountain snowfall during the next 2 months.

Irrigators not having stored water or good water rights, may want to consider alternatives to minimize the impact of pending short water supplies.

Headwaters below average

Snowpack percentages deteriorated this past month in the northern part of the drainage while southern areas remained about the same. All headwater areas have less than average amounts of water stored in the mountain snowpack. Northern drainages continue to show better snow conditions than do the southern watersheds.

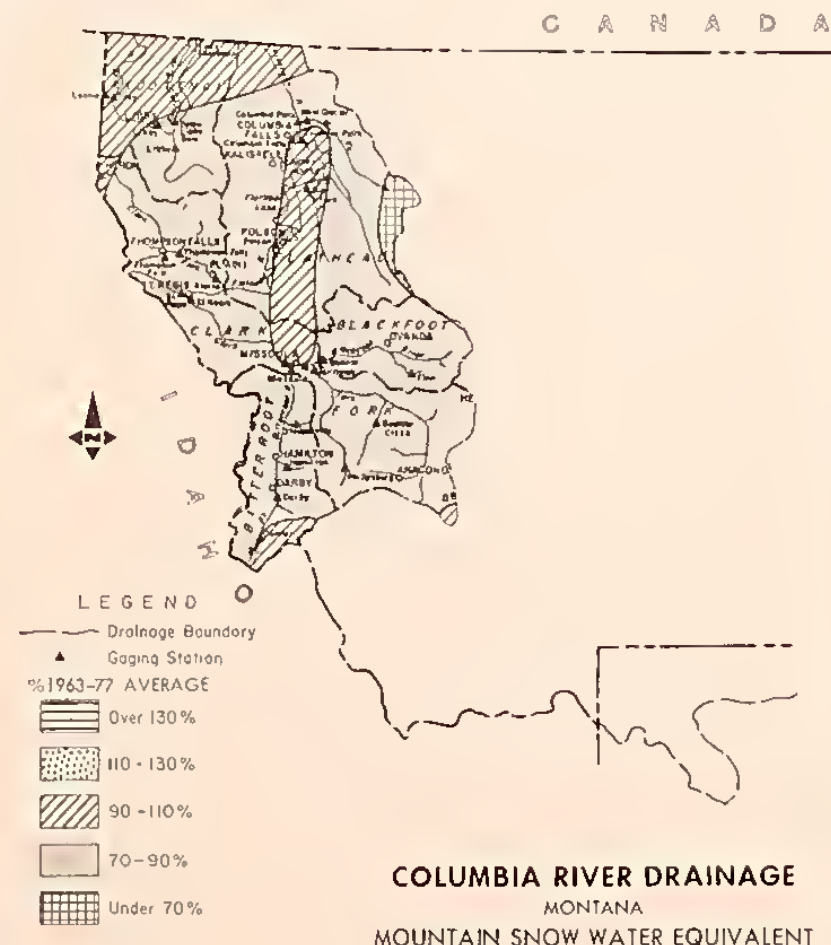
The weather pattern over the last 2 months has not been favorable for good mountain snowfall. If the next 2 months continue to have the same weather trends, shortages of water supplies can be expected in most drainages by mid-season.

STREAM/AREA	Flow Period	
	Spring Season	Late Season

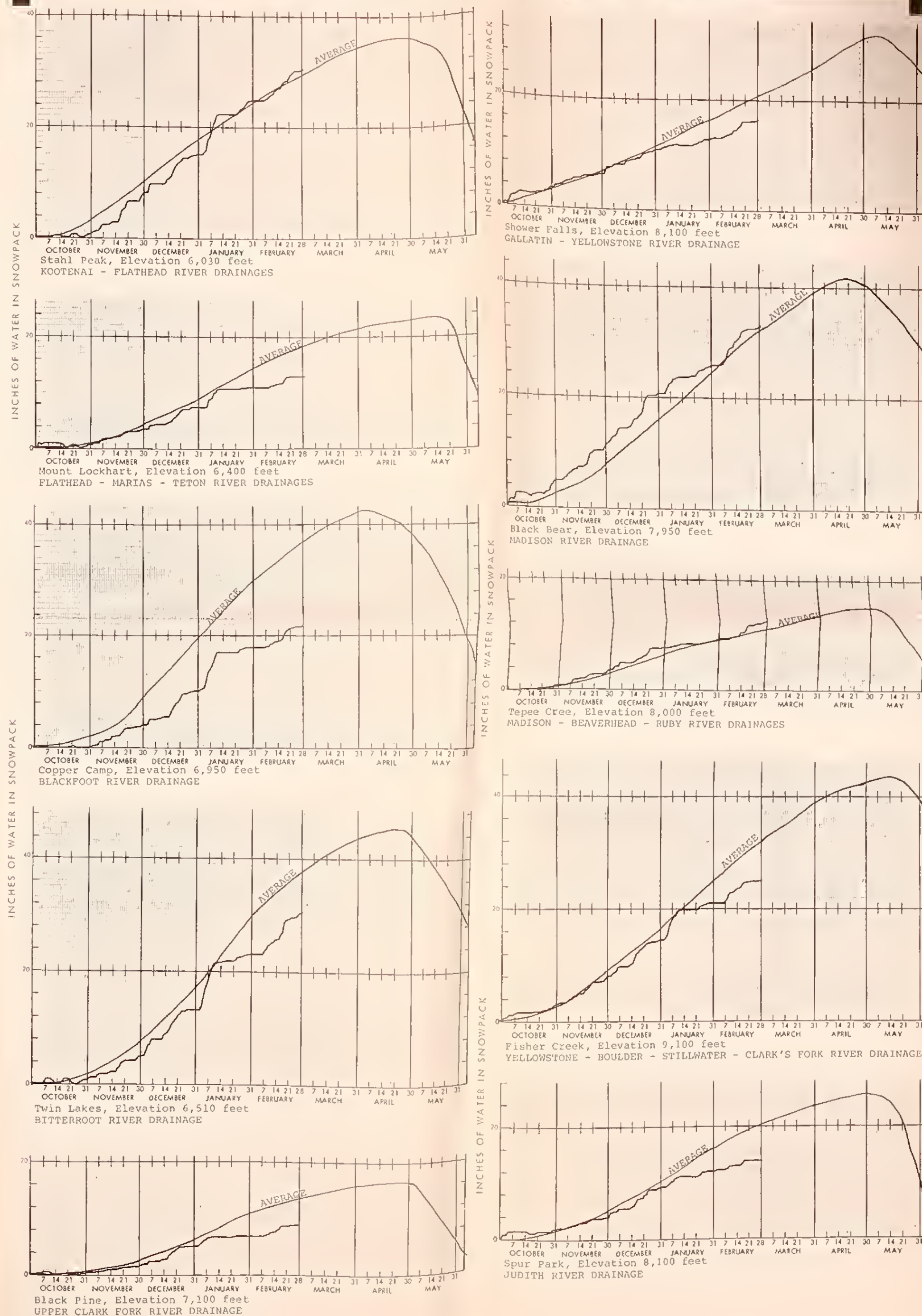
Tobacco	Avg	Avg
Little Bitterroot	Avg	Fair
Mission Valley	Avg	Avg
Flint Creek	Fair	Fair
Upper Clark Fork	Fair	Fair
Nevada Creek	Fair	Fair
Blackfoot	Fair	Poor
West-side Bitterroot	Fair	Fair
East-side Bitterroot	Fair	Fair
Bitterroot River	Fair	Fair
Lower Clark Fork	Fair	Fair



Good early season snowfall followed by colder temperatures created a depth hoar layer in the bottom of the snowpack in some areas. This loosely bonded layer, sometimes referred to as "sugar snow," and lack of bonding within the remainder of the snowpack has helped produce numerous avalanches this season.



SNOW PILLOW DATA



RESERVOIR STORAGE (Thousand Acre Feet) END OF MONTH February 28, 1983

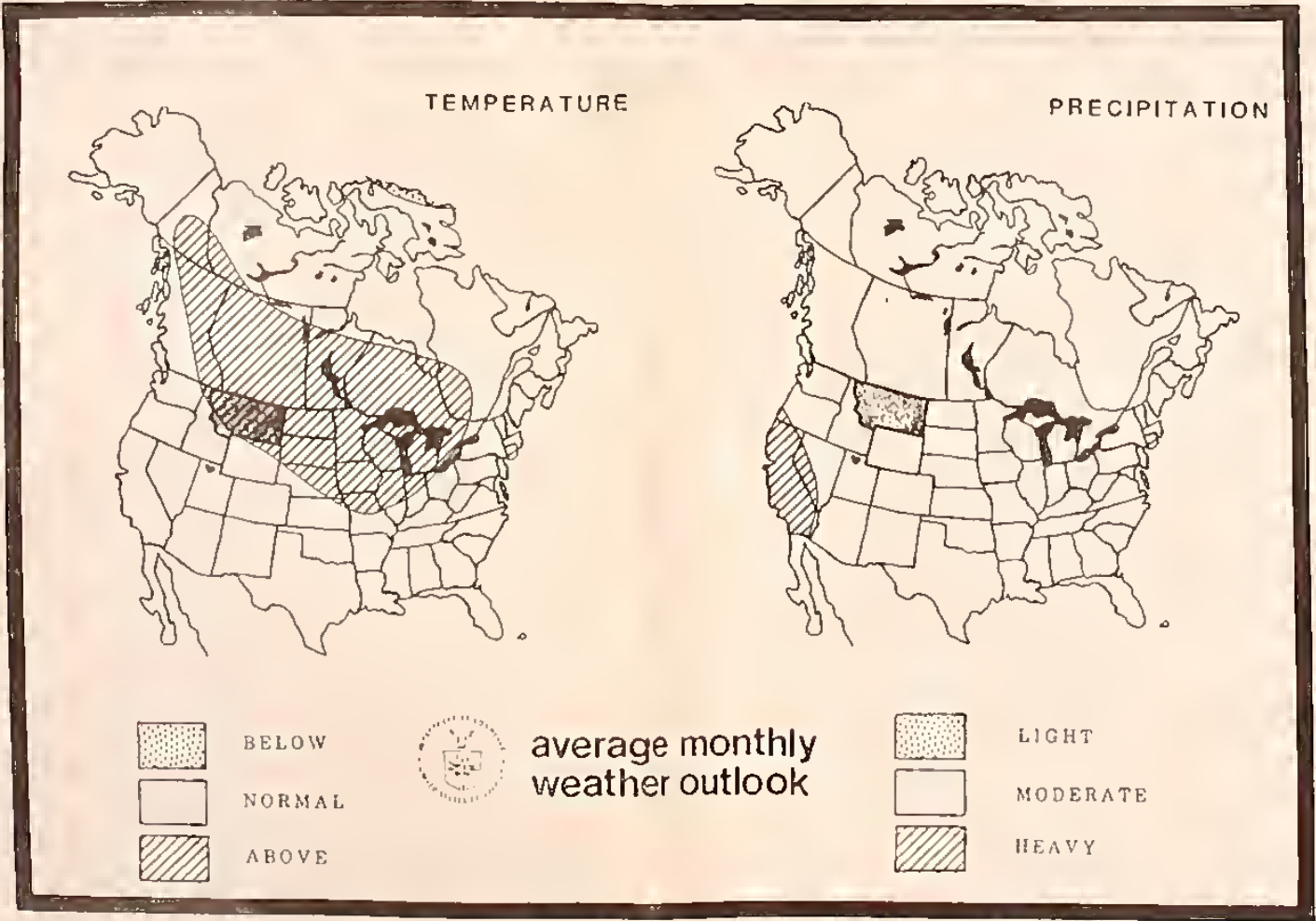
Basin or Stream	Reservoir	Usable Capacity	Usable Storage		
			Total Mgd.	Cum. Feet	Average
COLUMBIA					
Kootenai	Kootenai	5,748.2	2,189.8	2,203.0	---
Flathead	Hungry Horse	3,451.0	2,831.0	2,327.0	2,200.0
	Flathead Lake	1,791.0	752.8	744.4	994.6
	Comas (4)	45.2	31.2	22.6	21.9
	Mission Valley (8)	100.3	43.7	24.8	38.7
	Georgetown Lake	31.0	26.6	29.6	25.6
Clark Fork	Lower Willow Creek	4.9	1.6	2.3	1.7
	Nevada Creek	12.6	6.9	8.0	5.6
	Noxon Rapids	334.6	315.4	310.9	299.1
	Painted Rocks	31.7	---	---	17.4
Bitterroot	Conio	34.9	14.6	---	13.6
MISSOURI					
Beaverhead	Lima	84.0	51.4	26.2	40.2
	Clark Canyon	257.2	165.0	160.1	137.9
Ruby	Ruby	38.8	27.6	---	27.7
Madison	Hebgen Lake	377.5	273.0	273.8	243.3
	Ennis Lake	41.0	30.7	31.6	35.4
Gallatin	Middle Creek	8.0	3.8	3.8	3.6
Missouri	Canyon Ferry	2,043.0	1,691.0	1,535.0	1,606.0
	Hauser & Helena	61.9	63.0	63.0	60.6
	Lake Helena	10.4	10.9	10.9	10.0
	Holter Lake	81.9	81.0	79.6	64.6
	Fort Peck Lake	18,910.0	15,640.0	14,100.0	15,370.0
	Smith River	10.6	8.6	7.3	7.2
	Newlan Creek	12.4	8.7	10.1	---
	Bair	7.0	5.2	3.8	4.9
Musselshell	Martinsdale	23.1	18.3	11.3	9.9
	Deadman's Basin	72.2	63.1	---	49.4
	Gibson	99.1	61.8	50.3	44.6
Sun	Willow Creek	32.2	24.2	23.8	21.8
	Pishkun	32.0	19.9	19.6	16.4
	Lower Two Medicine	11.9	---	---	5.8
Marias	Four Horns	19.2	---	---	13.1
	Swift	30.0	14.9	10.0	15.4
	Lake Frances	111.9	85.1	77.8	71.0
Milk	Elwell (Tiber)	1,347.0	693.7	491.8	538.9
	Beaver Creek	3.5	3.1	2.0	1.5
	Fresno	127.2	13.2	31.5	66.4
	Nelson	66.8	44.4	28.8	41.9
HUDSON BAY					
St. Mary's	Lake Sherburne	64.3	35.8	18.1	22.5
YELLOWSTONE					
Stillwater	Mystic Lake	21.0	3.9	3.1	7.2
Clark's Fork	Cooney	27.4	17.6	1.0	15.3
Tongue	Tongue River	68.0	18.4	18.5	37.0
Bighorn	Bighorn Lake	1,356.0	962.6	859.7	527.8

SATELLITE SNOW COVER



MISSOURI RIVER BASIN

DATE	PERCENT SNOW COVER	AVERAGE SNOWLINE ELEVATION IN FEET
November 14, 1982	81	5290
November 1982	96	4300
November 24, 1982	95	4380
December 24, 1982	100	3800
January 18, 1983	76	5540
January 25, 1983	71	5770
February 3, 1983	76	5540
February 24, 1983	72	5720



AGENCIES AND ORGANIZATIONS COOPERATING IN MONTANA SNOW SURVEYS

GOVERNMENT AGENCIES

Canada

- Department of the Environment
- Atmospheric Environment Service
- Water Management Service
- British Columbia Ministry of Environment
- Inventory and Engineering Branch, Hydrology Section
- Alberta Environment
- Technical Services Division

Federal

- Department of the Army - Corps of Engineers
- Department of Agriculture - Forest Service
- Soil Conservation Service
- Department of Commerce - National Environmental Satellite Service
- National Weather Service
- Department of Interior - Bureau of Indian Affairs
- Fish and Wildlife Service
- Geological Survey
- National Park Service
- Bureau of Reclamation
- Department of Energy - Bonneville Power Administration

STATE AGENCIES

- Montana Conservation Districts
- Montana Department of Fish, Wildlife and Parks
- Montana Department of Natural Resources and Conservation
- Montana State University - Agricultural Experiment Station
- University of Montana - School of Forestry

PRIVATE ORGANIZATIONS

- The Anaconda Company
- Big Sky of Montana
- Butte Water Company
- Flathead Valley Community College
- Montana Power Company

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.